

Dr. Bryana Henderson (JPL/Caltech)
Scientist, Jet Propulsion Laboratory
4800 Oak Grove Drive • M/S 180-301
Pasadena, CA 91109
(818) 354-2416; Bryana.L.Henderson@jpl.nasa.gov

EXPERIENCE

Over the last decade, Dr. Bryana Henderson has used mass spectrometry and spectroscopy to study reactions in extreme environments, ranging from photolysis and electron-induced reactions in astrophysical ices to laser-induced drug delivery via nanomachines inside cancer cells. Since joining JPL as a NASA Postdoctoral Fellow in 2012, she has studied chemistry of organics and prebiotic materials in astronomical and planetary materials and more recently has focused on instrument development using supercritical extraction technologies to improve identification of organics on the surfaces of other planets and moons of our Solar System. Dr. Henderson is now PI of several new investigations that employ spectroscopy and mass spectrometry to understand chemical evolution in icy, radiation-drenched environments like those found on Jupiter's moon Europa and on comets and to develop new robust instrumentation for detection of organics in these difficult environments. With wide-ranging applications of this work (e.g. instrument design, life detection, mission planning), her ultimate goal is to contribute towards understanding of the origins of life and habitability in our solar system and beyond.

EDUCATION

2011 Ph. D., M.S. (Physical Chemistry), UCLA. Graduate Advisor: Jeffrey I. Zink
2005 B.A. (Chemistry), Lawrence University, Appleton, WI.

APPOINTMENTS

2015 – Present Scientist, Planetary Ices Group, JPL
2012 – 2015 NASA Postdoctoral Fellow, Caltech Postdoctoral Scholar (Mass Spectrometry, Ice Spectroscopy, Radiation Processes), JPL (advisor: Murthy Gudipati)
2011 – 2012 Scientific Consultant, Science and Sensors Technologies (fiber optics, polymer sensor design)
2005 – 2011 Research/Teaching Assistant (Physical Chemistry), UCLA
2005 Research Assistant (Atmospheric Chemistry), NASA-Langley Research Center, Hampton, VA (advisor: Margaret Pippen)
2004 Research Assistant (Spectroscopy), Santa Clara University REU Program

HONORS AND AWARDS

2017 Invited member of the “Unlocking the Climate Record Stored within Mars’ Polar Layered Deposits” study team. Workshops to be held by the Keck Institute for Space Studies at Caltech in 2017
2017 Organized/chaired session, “The Survival and Fate of Microbes and Molecules at the Near-Surface of Icy Worlds,” Astrobiology Science Conference, Mesa, AZ
2017 Invited member of the “Cryogenic Comet Sample Return – Compelling New Science vs. Technological Challenges” study team. Workshops to be held by the Keck Institute for Space Studies at Caltech in 2017

2017	Invited talk, "Chemical processing in interstellar grains via electron and UV radiation," 253 rd ACS meeting, San Francisco, CA
2016	Invited talk, "Frontiers of Solar System Chemistry: Chemistry and Icy Bodies" session, listed as a "Must-See Presenter," 252 nd ACS meeting, Philadelphia, PA
2016	Invited talk, "How primitive are comets?" session, Bonn, Germany
2015	Early Career Travel Grant (Outer Planets Assessment Group, OPAG)
2014	American Astronomical Society International Travel Award (Exoplanet Summer Course in the Canary Islands)
2012-2014	NASA Postdoctoral Scholar Fellowship
2011	American Chemical Society WCC/Eli Lilly Travel Award
2005-2010	Regents Scholarship, University Fellowship (UCLA)
2009	NASA Group Achievement Award

PROFESSIONAL ACTIVITIES AND SERVICE

Dr. Henderson is a member of the Astrochemistry Subdivision of the American Chemical Society, a member of the Royal Society of Chemistry, an Affiliate of the Laboratory Astrophysics Division (LAD) of the American Astronomical Association, and has served as a reviewer for NASA fellowships and proposals and manuscripts from various journals. She is a member of the Caltech Management Association and serves as a judge for science fairs and gives invited talks at local schools. Dr. Henderson has held executive board positions in the campus programming boards at Lawrence University, UCLA, and Caltech, and serves as a mentor for undergraduates and postdocs at JPL.

SELECTED PUBLICATIONS

- Henderson, B.L., Gudipati, M.S., Bateman, F. (2018). "Leeb Hardness of Salty Europa Ice Analogs Exposed to MeV Electrons." *Icarus*, in revision.
- Postberg, F., Khawaja, N., Abel, B., Choblet, G., Glein, C., Gudipati, M.S., Henderson, B.L., Hsu, H., Kempf, S., Klenner, F., Moragas-Klostermeyer, G., Magee, B., Nölle, L., Perry, M., Reviol, R., Schmidt, J., Srama, R., Stolz, F., Tobie, G., Tieloff, M., Waite, J.H. (2018). "Macromolecular organic compounds emerge from deep hydrothermal sites on Enceladus." *Nature*, in press.
- Menlyadiev, M., B. L. Henderson, F. Zhong, Y. Lin & I. Kanik (2018). "Extraction of Amino Acids using Supercritical Carbon Dioxide for in Situ Chemical Analysis for Astrobiological Applications." *International Journal of Astrobiology*, Apr: p.1-10.
- Bekaert, D. V., Avice, G., Marty, B., Henderson, B., & Gudipati, M. S. (2017). "Stepwise heating of lunar anorthosites 60025, 60215, 65315 possibly reveals an indigenous noble gas component on the Moon." *Geochimica et Cosmochimica Acta*, 218, 114-131.
- Henderson, B.L., Gudipati, M., (2015). Direct Detection of Complex Organic Products in Irradiated Astrophysical Ice Analogs. *The Astrophysical Journal*, 800(1), 66.
- Henderson, B.L., Gudipati, M.S. (2014). Plume Composition and Evolution in Multi-Component Ices Using Resonant Two-Step Laser Ablation and Ionization Mass Spectrometry (2S-LAI-MS). *Journal of Physical Chemistry A*, 118 (2014) 5454-5463.
- Brown, J.W., Henderson, B.L., Kiesz, M.D., Whalley, A.C., Morris, W., Grunder, S., Deng, H., Furukawa, H., Zink, J.I., Stoddart, & J.F., Yaghi, O.M. (2013). Photophysical pore control in an azobenzene-containing metal-organic framework. *Chemical Physics*, 4(7), 2858-2864.
- Lau, Y.A., Henderson, B.L., Lu, J., Ferris, D.P., Tamanoi, F., & Zink, J.I. (2012). Continuous Spectroscopic Measurements of Photo-Stimulated Release of Molecules by Nanomachines in a Single Living Cell. *Nanoscale*, 4(11), 3482-3489.
- Kuzmanich, G., Simoncelli, S., Gard, M., Spaenig, F., Henderson, B.L., Guldi, D., Garcia-Garibay, M. (2011). Excited State Kinetics in Crystalline Solids: Self-Quenching in Nanocrystals of 4,4'-

Disubstituted Benzophenone Triplets Occurs by an n-Type Mechanism. *Journal of the American Chemical Society*, 133(43), 17296–17306.

George, S., Pokhrel, S., Ji, Z., Henderson, B.L., Xia, T., Linjiang, L., Zink, J.I., Nel, A.E., Mädler, L. (2011). Role of Fe doping in tuning the band gap of TiO₂ for photo-oxidation induced cytotoxicity paradigm. *Journal of the American Chemical Society*, 133(29), 11270–11278.

Creilson, J.K., Pippin, M.R., Henderson, B.L., Ladd, I.H., Fishman, J., Votápková, D., & Krpcová, I. (2008). Surface Ozone Measured at GLOBE Schools in the Czech Republic: A Demonstration of the Importance of Student Contribution to the Larger Science Picture. *Bulletin of the American Meteorological Society*, 89(4), 505–514.

Ow, F.P., Henderson, B.L., & Zink, J.I. (2007). Multiple Photochemical Reaction Pathways in a Ni(II) Coordination Compound. *Inorganic Chemistry*, 46(6), 2243-2248.